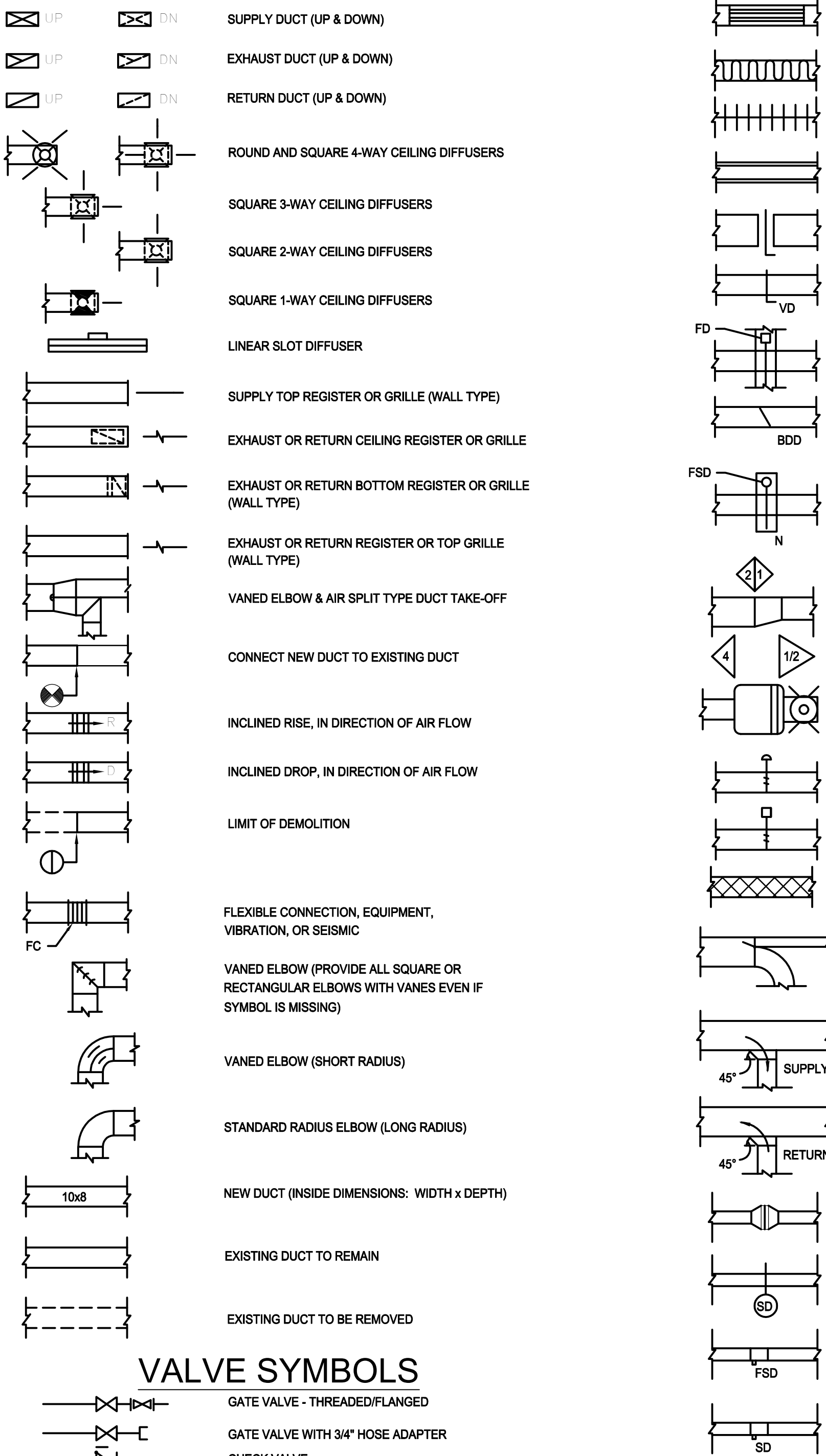
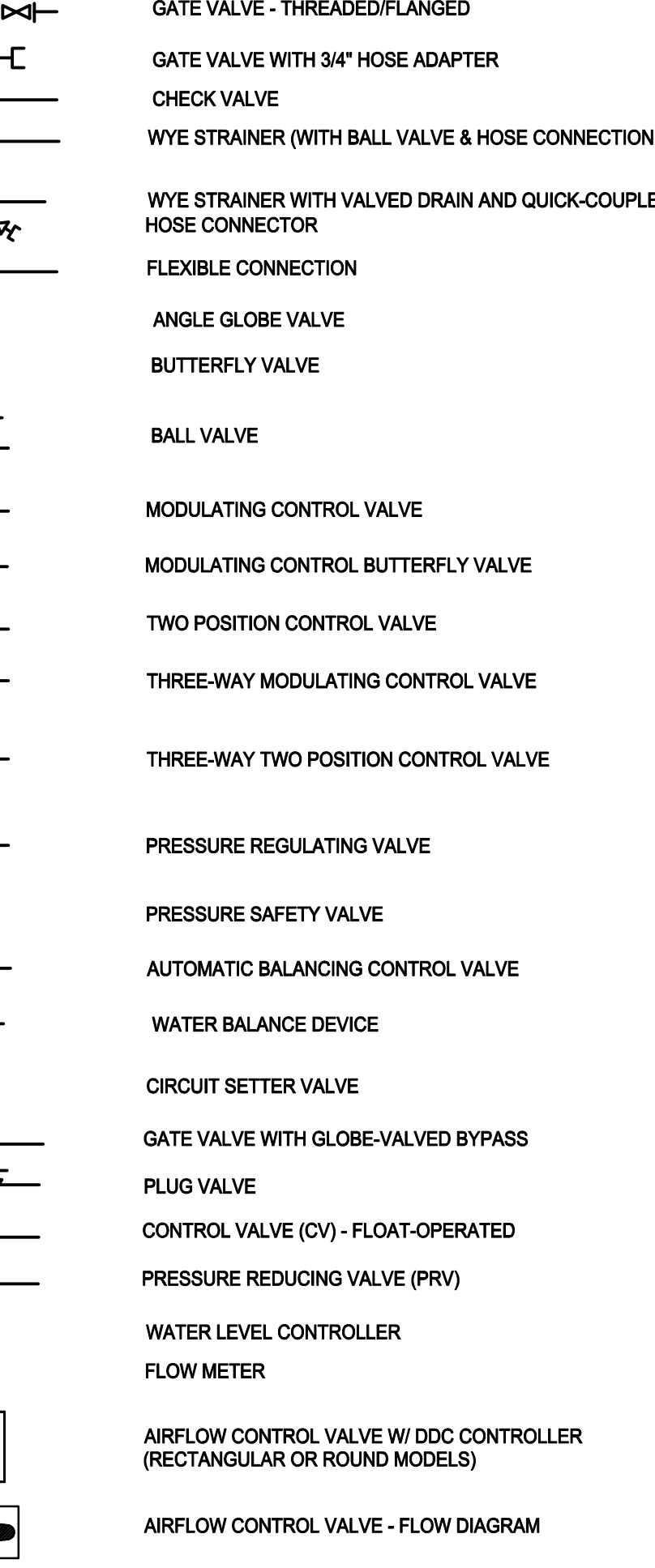


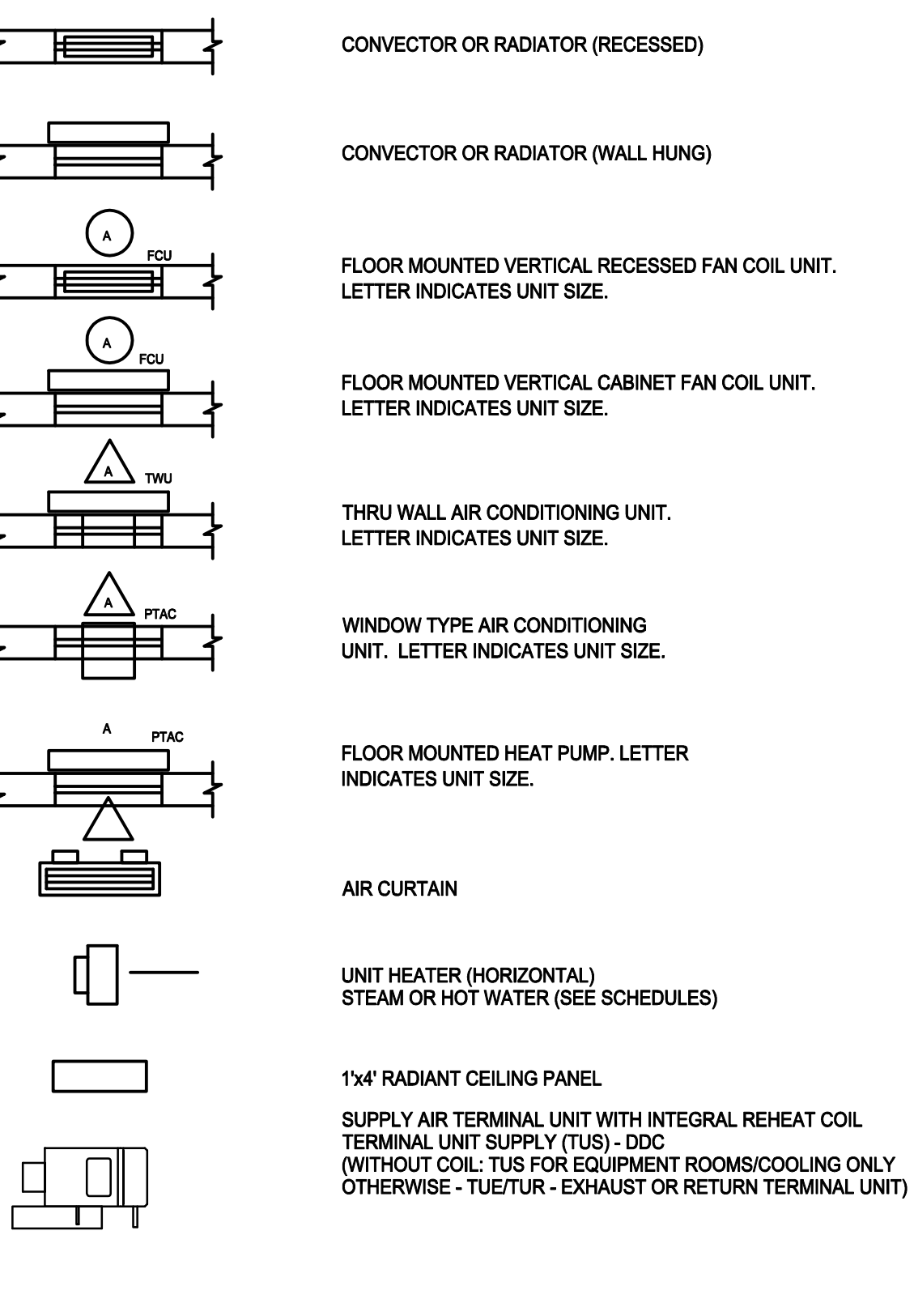
DUCTWORK SYMBOLS



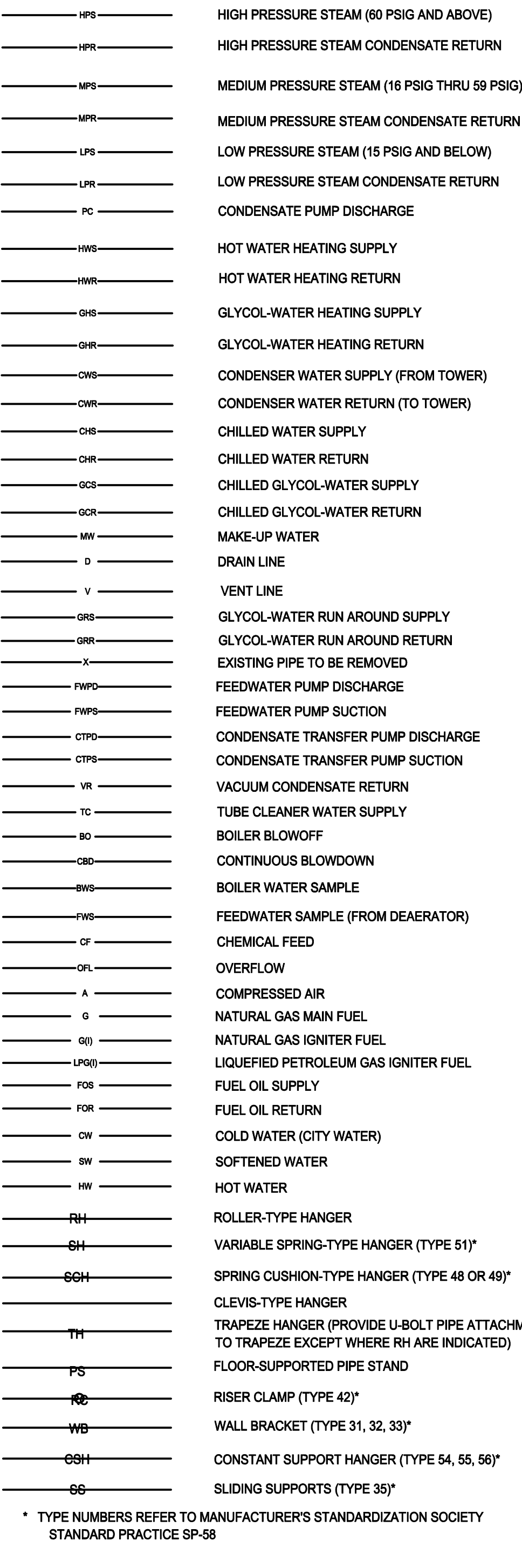
VALVE SYMBOLS



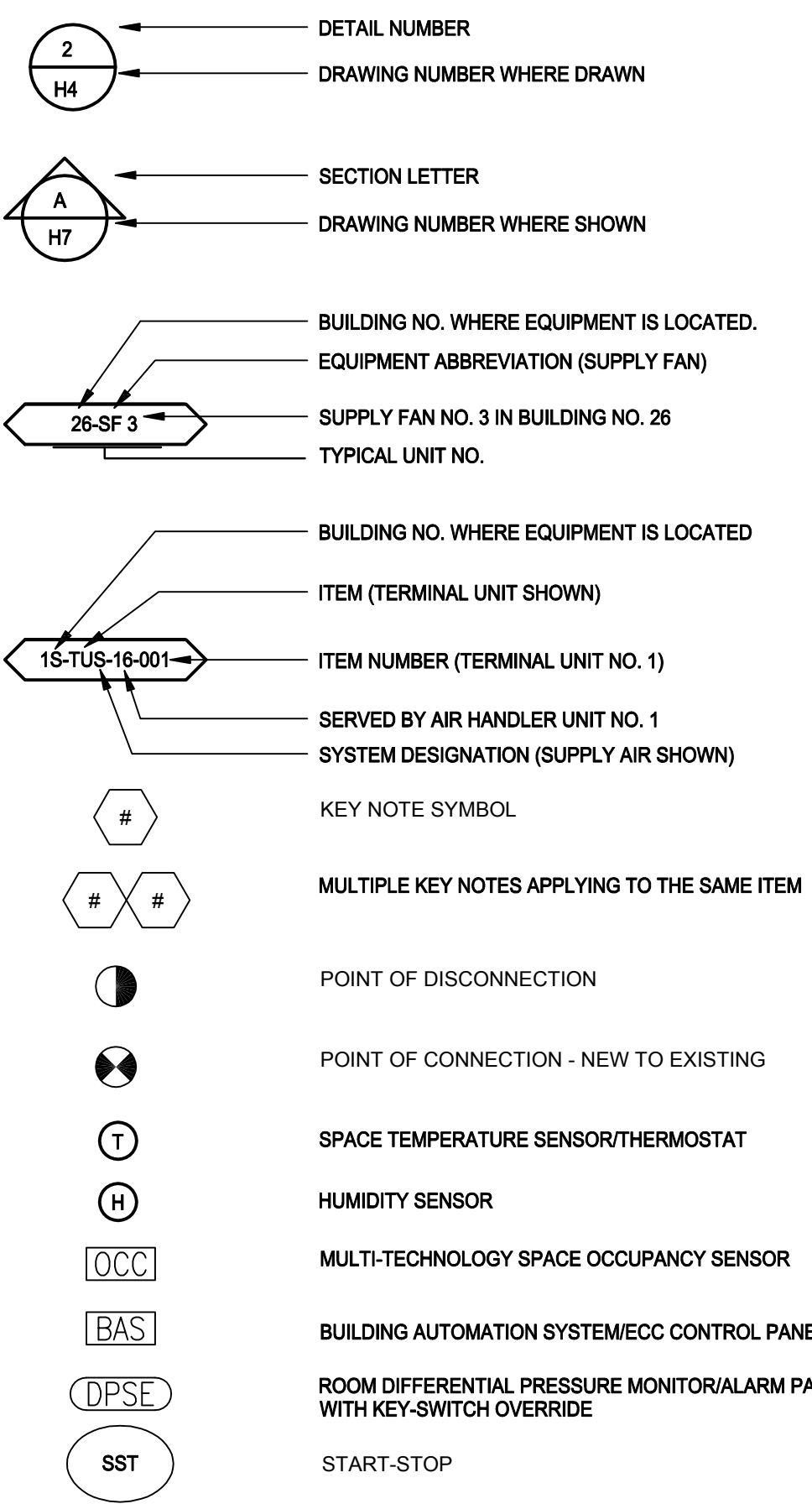
TERMINAL UNIT SYMBOLS



PIPING SYMBOLS



DRAWING SYMBOLS



ABBREVIATIONS

A/E	ARCHITECT / ENGINEER	EA	EXHAUST AIR	J	INTENTIONALLY LEFT BLANK	SA	SUPPLY AIR
AB	AIR BLENDER	EAT	ENTERING AIR TEMPERATURE	kg	KILOGRAM	SAD	SOUND ATTENUATING DEVICE
AAV	AUTOMATIC AIR VENT	EC	EVAPORATIVE COOLER	kg/hr	KILOGRAM PER HOUR	SAT	SUPPLY AIR TEMPERATURE
ACC	AIR COOLED CONDENSER	ECC	ENGINEERING CONTROL CENTER	kPa	KILOPASCAL	SC	SHADING COEFFICIENT
ACCH	AIR COOLED CHILLER	ECU	EVAPORATIVE CONDENSER UNIT	kW	KILOWATT	SCFM	STANDARD CUBIC FEET PER MINUTE
ACCU	AIR-COOLED CONDENSING UNIT	EER	ELECTRIC DUCT HEATER	kWh	KILOWATT HOUR	SCI	SPINAL CODE INJURY
ACU	AIR CONDITIONING UNIT	EF	ENERGY EFFICIENCY RATIO	L	LITER	SCR	SILICON CONTROLLED RECTIFIER
ACD	AUTOMATIC CONTROL DAMPER/TWO POSITION	EG	EXHAUST GRILLE	L/h	LITERS PER HOUR (OR LITERS/HOUR)	SD	SMOKE DETECTOR
AD	ACCESS DOOR	EGH	EMERGENCY GAS SHUTOFF	L/min	LITERS PER MINUTE (OR LITERS/MINUTE)	SD-1	SCHEMATIC DESIGN (SUBMISSION1)
AF	AFTER FILTER	EHS	ENTERING GLYCOL TEMPERATURE	L/s	LITERS PER SECOND (OR LITERS/SECOND)	SD-2	SCHEMATIC DESIGN (SUBMISSION2)
AFCV	AIR FLOW CONTROL VALVE	EH	EXHAUST HOOD	LAT	LINEAR TEMPERATURE	SDR	SMOKE DAMPER
AFF	ABOVE FINISHED FLOOR	EJ	EXPANSION JOINT	LSB/HR	POUNDS PER HOUR	SDR	SMOKE DAMPER (RETURN)
AFMD	AIR FLOW MEASURING DEVICE	EMD	ENTERING WATER	LF	LINEAR FOOT (FEET)	SDP	SMOKE DAMPER (SUPPLY)
AFW	AIR FLOW WHEEL (FAN)	EN	ENTERING	LFD	LAMINAR FLOW DIFFUSER	SEN	SENSIBLE HEAT
AHU	AIR-HANDLING UNIT	ER	EXHAUST REGISTER	LGT	LEAVING GLYCOL TEMPERATURE	SG	SUPPLY FAN
AMP	AMPERE	ERC	ELECTRIC REHEAT COIL	LH	LATENT HEAT	SGF	SUPPLY AIR GRILLE
AP	ACCESS PANEL	ERC	ELECTRIC RADIANT PANEL	LPC	LOW PRESSURE STEAM CONDENSATE RETURN	SH	STEAM HUMIDIFIER
APD	AIR PRESSURE DROP	ESP	EXTERNAL STATIC PRESSURE	LPG	LIQUID PROPANE GAS	SHC	STEAM HEATING COIL
ARI	AIR RADIANT	ET	EXPANSION TANK	LPR	LOW PRESSURE RETURN (STEAM CONDENSATE)	SHC	SQUARE INCHES
AS	AIR SEPARATOR	ETO	ETHYLENE OXIDE	LPRC	LOW PRESSURE STEAM RETURN (CLEAN)	SP	STATIC PRESSURE
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	EUI	ELECTRIC UNIT HEATER	LLHX	LIQUID TO LIQUID HEAT EXCHANGER	SP GR	SPECIFIC GRAVITY
AW	AIR WASHER	EWC	EVAPORATIVE WATER COOLER	LPS	LOW PRESSURE STEAM	SPD	STEAM PRESSURE REDUCING VALVE
AXF	AXIAL FLOW	EWT	ENTERING WATER TEMPERATURE	LPC	LOW PRESSURE STEAM (CLEAN)	SPS	STATIC PRESSURE SENSOR
B	BOILER	F	FARENHEIT	LVT	LOCAL TEMPERATURE CONTROL PANEL	SQ FT	SQUARE FOOT (FEET)
BD	BUTTERFLY DAMPER	FAT	FLOAT AND THERMOSTATIC	LVT	LEAVING WATER TEMPERATURE	SR	SUPPLY AIR REGISTER
BDD	BACKDRAFT DAMPER	FA	FREE AREA	M	METER, SI UNIT	SS	STAINLESS STEEL
BDR	BASE BOARD RADIATOR	FC	FLEXIBLE CONNECTION	M	METER, SI UNIT	SSR	SOLID SEPARATOR
BFCU	BACKFLOW PREVENTER	FCU	FAN COIL UNIT (4 PIPE)	Mb	METERS PER SECOND (OR METERS/SECOND)	ST	STEAM TRAP
BFT	BOILER PLANT FIRE TUBE	FDO	FAN COIL UNIT COOLING ONLY	MA	MIXED AIR TEMPERATURE	SU	STEAM UNIT HEATER
BH	BOTTOM GRILLE	FDUH	FAN COIL UNIT HEATING ONLY	MAT	MAKE-UP AIR UNIT	SV	STEAM PRESSURE REDUCING VALVE
BHP	BRAKE HORSEPOWER	FD	FLOOR DRAIN	MAU	MAKE-UP AIR UNIT	SVS	STEAM TO WATER HEAT EXCHANGER
BHW	HOT WATER HEATING BOILER	FDM	FIRE DAMPER	MAV	MANUAL AIR VENT	T & PCV	TEMPERATURE AND PRESSURE
BKF	BASE KILN FURNACE	FN	FINAL FILTER	MAX	MAXIMUM	TAB	TESTING, ADJUSTING, BALANCE
BKH	BOILER KILN FURNACE	FS	FUEL GAS/FUELED WATER HEAT EXCHANGER	MB	MIXING BOX	TD	TEMPERATURE DIFFERENCE
BIW	BIOWARD INCLINED WHEEL (FAN)	FDH	FLOOR DRAIN	MCA	MINIMUM BRANCH CIRCUIT AMPACITY	TDH	TOTAL DYNAMIC HEAD
BM	BONE MARROW TRANSPLANT	FM	FLOOR REGISTER	MER	MINIMUM EFFICIENCY REPORTING	TDS	TOTAL DISSOLVED SOLIDS
BR	BOTTOM REGISTER	FOT	FUEL OIL TANK	MH	MANHOLE	TG	TRANSFER GRILLE
BRD	BAROMETRIC RELIEF DAMPER	FOH	FUEL OIL HEAT EXCHANGER	MHP	MOTOR HORSEPOWER	TP	TRAP
BSC	BIOLOGICAL SAFETY CABINETS	FPM	FEET PER MINUTE	MIN	MINIMUM	TRP	TOP REGISTER
BT	BLOWOFF TANK	FPS	FEET PER SECOND	MM	MILLIMETER	TSP	TOTAL STATIC PRESSURE
BTU	BRITISH THERMAL UNIT	FPU	FAN POWERED TERMINAL UNIT	MOV	MOTOR OPERATED VALVE	TSTAT	THERMOSTAT
BTUH	BRITISH THERMAL UNIT PER HOUR	FPR	FIBER REINFORCED POLYESTER	MPC	MEDIUM PRESSURE STEAM CONDENSATE RETURN (STEAM CONDENSATE)	TU	TERMINAL UNIT
BWT	BOILER PLANT WATER TUBE	FSD	COMBINATION FIRE SMOKE DAMPER	MPR	MEDIUM PRESSURE RETURN (STEAM CONDENSATE)	TWU	THRU-WALL UNIT
C	CENTIGRADE (CELIUS)	FSW	FLOW SWITCH	MPS	MEDIUM PRESSURE STEAM	UC	UNDER CUT
CC	COIL	FT	FEET	MRI	MAGNETIC RESONANCE IMAGING	UC	UNIT COOLER
CCD	COOLING COIL CONDENSATE DRAIN	FT/LB	FOOT-POUND	MTD	MEAN TEMPERATURE DIFFERENCE	UH	UNIT HEATER
CD	CEILING DIFFUSER	FTR	FIN TUBE RADIATION	MVD	MANUAL VOLUME DAMPER	UL	UNDERWRITERS LABORATORY
CE	CEILING	FV	FACE VELOCITY	MZ	MULTI-ZONE	ULV	UPBLAST UNIT VENTILATOR
CEH	CENTRIFUGAL	GA	GAUGE	NA	NOT APPLICABLE	V	VALVE
CFH	CUBIC FEET PER HOUR	GH	GALLONS	NC	NOISE CRITERIA	VAF	VANE-AXIAL FAN
CFM	CUBIC FEET PER MINUTE	GH	GRAVITY HOOD	NC	NORMALLY CLOSED	VAF	VARIABLE AIR VOLUME
CFT	CUBIC FEET	GH	GALLONS PER DAY	NGM	NATURAL GAS FLOWMETER	VDF	VOLUME DAMPER (MANUAL OPPOSED BLADE)
CFP	CHEMICAL FEED PUMP	GPH	GALLONS PER HOUR	NO	NORMALLY OPEN	VHA	VETERANS HEALTH ADMINISTRATION
CG	CEILING GRILLE	GPM	GALLONS PER MINUTE	NOAA	NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION	VIB	VIBRATION ISOLATOR
CH	CHILLER	GPR	GAS PRESSURE REGULATOR	NOM	NOMINAL	VIV	VARIABLE INLET VANES
CHW	CHILLER WATER PUMP	GS	GALVANIZED STEEL	NPLV	NON-STANDARD PART LOAD VALUE	VP	VACUUM
CHR	CHILLED WATER RETURN	H	HUMIDIFIER	NPSH	NET POSITIVE SUCTION HEAD	VPS	VARIABLE PRIMARY SYSTEM
CHS	CHILLED WATER SUPPLY	HACW	HOT & COLD WATER	NTS	NOT TO SCALE	VSD	VARIABLE SPEED DRIVE
CI	CAST IRON	HAC	HOUSEKEEPING AID CLOSET	OA	OUTSIDE AIR	VUH	VERTICAL UNIT HEATER
CM	CARBON MONOXIDE	HB	HOSE BIBB	OAG	OUTSIDE AIR	W	WATTS
CM	CUBIC METER	HC	HEATING COIL	OAG	OUTSIDE AIR	WAG	WASTE ANESTHESIA GAS
CMS	CUBIC METER PER SECOND	HD	HEAD	OAI	OUTSIDE AIR	WB	WET-BULB (TEMPERATURE)
CO	CLEAN OUT	HO	HOOD	OD	OUTSIDE DIAMETER	WC	WATER COOLED
CO2	CARBON DIOXIDE	HOA	HANDOFF/AUTOMATIC	OD	OUTSIDE DIAMETER	WCCH	WATER COOLED CHILLER
COMP	COMPRESSOR UNIT	HP	HEAT PUMP	OP	OPERATING ROOM	WCCU	WATER COOLED CONDENSING UNIT
COP	COEFFICIENT OF PERFORMANCE	HPC	HORSEPOWER	OR	OPERATING ROOM	WCP	WATER COOLED HEAT PUMPS
CP	CEILING REGISTER	HPD	HIGH PRESSURE STEAM CONDENSATE RETURN	PA	PASCAL	WCPH	WATER COOLED PACKAGED UNIT
CR	CONDENSATE PUMP	HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)	PC	PUMPED CONDENSATE	WCU	WALL EXHAUST FAN
CS	CONDENSATE STORAGE TANK	HPS	HIGH PRESSURE SUPPLY (STEAM)	PCF	POUNDS PER CUBIC FOOT (FEET)	WF	WATER FILTER
CT	CEILING TOWER	HPD	HIGH PRESSURE DRAIN TRAP	PD	PRESSURE DROP	WFCV	WATER FLOW CONTROL VALVE
CSG	CLEAN STEAM GENERATOR	HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)	PF	PRE-FILTER	WFM	WATER FLOWMETER
CT	CEILING TOWER	HPS	HIGH PRESSURE SUPPLY (STEAM)	PG	PRESSURE GAGE	WFG	WATER FLOW MEASURING DEVICE
CW	COLD WATER (POTABLE)	HRC	HOT WATER RETURN	PHC	PREHEAT COIL	WR	WATER SEQUENCE DROP
CWC	CONDENSER WATER PUMP	HRC	HEAT RECOVERY COIL	PPM	PARTS PER MILLION	YR	YEAR
CWR	CONDENSER WATER RETURN (TO COOLING TOWER)	HRC	HEAT RECOVERY DEVICE	PR	PRESSURE RELIEF VALVE		
CWS	CONDENSER WATER SUPPLY (FROM COOLING TOWER)	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	PRD	PRESSURE RELIEF DAMPER		
D	DAMPER - AUTOMATIC	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	PRV	PRESSURE REGULATING VALVE		
D-1	RETURN AIR DAMPER	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	PSIA	POUNDS PER SQUARE INCH - ABSOLUTE		
D-2	RELIEF AIR DAMPER	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	PSI	POUNDS PER SQUARE INCH - GAGE		
D-3	DECIBELS	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	PSI	POUNDS PER SQUARE INCH - GAGE		
D-4	DRY-BULB TEMPERATURE	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	PTAC	PACKAGED TERMINAL AIR CONDITIONER		
DDC	DIRECT DIGITAL CONTROLS	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RE	RETURN OR EXHAUST		
DEG	DEGREE	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RA	REFRIGERANT AIR DRYER		
DF	DIFFUSER	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RAD	RADIO FREQUENCY		
DIA	DIAMETER	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RAF	ROTARY AIR HEAT EXCHANGER		
DIW	DIEN POINT TEMPERATURE	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RAT	RETURN AIR TEMPERATURE		
DP	DIFFUSER PLATE	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RCCH	REMOTE CONDENSER CHILLER		
DPA	DIFFERENTIAL PRESSURE ASSEMBLY	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RCU	RECIROCATING CHILLER UNIT		
DPS	DIFFERENTIAL PRESSURE SENSOR	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RDG	ROOM DATA SHEETS		
DX	DIFFERENTIAL EXPANSION	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	REA	RELIEF AIR		
DXCC	DIFFERENTIAL EXPANSION COOLING COIL	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RG	RETURN GRILLE		
(D)	DEMOLISHED	HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RI	RELATIVE HUMIDITY		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RHC	REHEAT COIL		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RHG	REFRIGERANT HOT GAS		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RL	REFRIGERANT LIQUID LINE		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RLA	RUN LOAD AMPERE		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RO	REVERSE OSMOSIS		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RR	RETURN REGISTER		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RS	REFRIGERANT SUCTION		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RTU	ROOF TOP UNIT		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	RV	RELIEF VALVE		
		HRC	HEAT RECOVERY DEVICE (HYDRONIC RADIANT (CEILING))	(R)	RELOCATED		

100% CONSTRUCTION DOCUMENTS
FULLY SPRINKLERED

CONSULTANTS:			ARCHITECT / ENGINEERS:			Drawing Title MECHANICAL COVER SHEET			Project Title RENOVATE SURGICAL SERVICE & UPGRADE OPERATING ROOMS			Project Number 581-13-101			Office of Construction and Facilities Management Department of Veterans Affairs					
						Approved: Medical Center Director			Location HUNTINGTON, WV			Building Number 1S								
									Drawing Number M0.01			Dwg. 042 of 178								
NO. DESCRIPTION DATE			COMMONWEALTH OF REGISTERED PROFESSIONAL ENGINEER THOMAS L. CHAPMAN NO. PE040438			Miller-Remick LLC M.E.P. & Structural Engineering A Service Disabled Veteran-Owned Small Business 1010 KINGS HIGHWAY SOUTH, CHERRY HILL, NEW JERSEY 08034 PHONE: (856)420-4000 FAX: (856)420-5002			PF&A PFS&A DESIGN ARCHITECTURE, PLANNING, INTERIORS West Trade Center 101 West Main Street, Suite 7000 Norfolk, VA 23510 Phone: 757-471-6837 Fax: 757-471-6026 www.pfa-architect.com			Date 10.31.2014			Checked MPP			Drawn JLR		

THESE DRAWINGS WERE PREPARED FROM INFORMATION TAKEN FROM THE AVAILABLE BUILDING DRAWINGS, ARCHITECTURAL BACKGROUNDS PROVIDED BY THE OWNER AND THE INFORMATION PROVIDED BY THE ENGINEER DESIGNATED FOR THE PROJECT. FOR THE PURPOSE OF ENGINEERING DESIGN, EXISTING CONDITIONS ARE SHOWN AS ACCURATELY AS POSSIBLE. THERE IS THE POSSIBILITY THAT CONDITIONS SHOWN ARE NOT EXACTLY AS SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, SIZES AND CONDITIONS AT THE SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO BEGINNING INSTALLATION OR FABRICATION WORK.

1.1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW THE PLANS AND SPECIFICATIONS, AS WELL AS ALL RELATED PROJECT PLANS AND SPECIFICATIONS FROM OTHER DISCIPLINES, TO BECOME FAMILIAR WITH THE FULL PROJECT SCOPE AND COORDINATED RESPONSIBILITIES.

1.2. SHOULD IT APPEAR THAT THE WORK INTENDED TO BE DESCRIBED OR RELATED TO HEREIN ARE NOT FULLY SHOWN, DETAIL OR EXPLAINED ON THE DRAWINGS, OR IN THE SPECIFICATIONS, CONSULT THE ENGINEER FOR NECESSARY CLARIFICATIONS, AND CONFORM TO THOSE CLARIFICATIONS INsofar AS THEY ARE CONSISTENT WITH THE ORIGINAL DRAWINGS AND SPECIFICATIONS, IN NO CASE SHALL WORK PROCEED IN UNCERTAINTY.

1.3. EQUIPMENT ARRANGEMENTS ARE DESIGNED TO SHOW PREFERRED CONFIGURATIONS TO SUIT KNOWN CONDITIONS. ACTUAL INSTALLATION BY CONTRACTOR MAY BE ALTERED AS REQUIRED TO SUIT FIELD CONDITIONS ENCOUNTERED DURING CONSTRUCTION WITHOUT COMPROMISING THE INTENT OF THE ORIGINAL DESIGN. CONTRACTOR SHALL BE RESPONSIBLE FOR THE ENGINEER'S ADVISOR PRIOR TO STARTING WORK IN AREAS AFFECTED.

1.4. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS AT SITE DO NOT SCALE TO STARTING WORK.

1.5. DO NOT SCALE DRAWINGS.

2. BIDDERS ARE TO VISIT THE SITE AND FAMILIARIZE THEMSELVES AS THE NATURE AND SCOPE OF THE WORK WHICH WILL REQUIRE ADDITIONAL INFORMATION. AN EXAMINATION HAS BEEN MADE AND ENSURE THAT ALL ALTERNATE PRICING INFORMATION NOTED WITHIN THE CONSTRUCTION DOCUMENTS HAVE BEEN INCLUDED WITHIN THE BID. SUBMITTALS OF BIDDERS, INCLUDING THE PROPOSAL, EQUIPMENT AND MATERIALS REQUIRED, FOR ANY DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD AN EXAMINATION BEEN MADE, WILL NOT BE ACCEPTED.

3. THE CONTRACTOR WILL BE RESPONSIBLE FOR ENSURING THAT ALL RULES AND REGULATIONS, INCLUDING THOSE WHICH MAY BE ISSUED BY THE OWNER, ARE BEING OBSERVED, PARTICULARLY WORKPLACE SAFETY AND THE CONDUCT OF ALL THOSE EMPLOYEES DIRECTLY AND INDIRECTLY ON THE PREMISES, AND THE OWNER'S EMPLOYEES WHO MAY BE IMPACTED OR AFFECTED BY CONSTRUCTION ACTIVITIES. THE CONTRACTOR WILL INSTALL SIGNAGE, BARRIERS, AND OTHER MEANS TO PROVIDE WARNING AND PERSONAL SAFETY. PLANT AND EQUIPMENT OF THE CONTRACTOR SHALL BE THE OWNER'S AND HIS ONGOING OPERATIONS AND WILL PROMPTLY BE REMOVED WHEN WORK IN A PARTICULAR AREA HAS BEEN COMPLETED.

3.1. DURING PERFORMANCE OF WORK, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVISION AND MAINTENANCE OF WARNING SIGNS, LIGHT SIGNAL DEVICES, GUARD LIGHTS, BARRICADES, GUARD RAILS, FENCES AND OTHER DEVICES, APPROPRIATELY STAFFED ON AND AROUND THE JOB SITE WHICH GIVE PROPER AND UNDERSTANDABLE WARNING TO PERSONS WITH REGARD TO HAZARDOUS CONDITIONS, EQUIPMENT AND OPERATIONS BEING PERFORMED IN CONJUNCTION WITH THE WORK.

4. THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH OTHER TRADES FOR ITEMS IN THEIR SCOPE OF WORK WHICH COULD REQUIRE ADDITIONAL INFORMATION, MECHANICAL/PLUMBING WORK, AND ITEMS THAT ARE NOT INDICATED ON THE DRAWINGS.

5. THIS INSTALLATION WILL CONFORM TO ALL CODES AND THE REQUIREMENTS OF FEDERAL, STATE, AND LOCAL REGULATORY AGENCIES HAVING JURISDICTION. IN PARTICULAR, THE WORK WILL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE INTERNATIONAL BUILDING CODE (2012 IBC), INCLUDING ALL OF ITS APPLICABLE SUBCODES AND AMENDMENTS.

6. ALL WORK WILL BE LAWFULLY EXECUTED IN A NEAT AND WORKMANLIKE MANNER AND WILL BE COMPLETED IN ACCORDANCE WITH THE GOVERNING CODES (ABOVE), INDUSTRY STANDARDS AND IN CONFORMANCE WITH THE MANUFACTURERS' RECOMMENDATIONS AND REQUIREMENTS.

7. WORK UNDER THIS CONTRACT SHALL CONSIST OF THE CONTRACTOR PROVIDING ALL LABOR, MATERIALS, AND SERVICES, INCLUDING WORK NOT SPECIFICALLY SHOWN BUT REASONABLY IMPLIED. THIS SHALL INCLUDE CUTTING, PATCHING AND RESTORATION OF EXISTING SURFACES DAMAGED BY THE CONTRACTOR'S WORK. THE CONTRACTOR SHALL ALSO PROVIDE ALL EQUIPMENT SHOWN OR SPECIFIED OR AN APPROVED EQUIVALENT. SUBSTITUTED EQUIPMENT OR MATERIALS SHALL NOT BE INSTALLED UNLESS GIVEN WRITTEN APPROVAL BY THE OWNER.

8. CONTRACTOR SHALL BE RESPONSIBLE FOR COSTS INCURRED FOR NONCOMPLIANCE WITH THESE CONTRACT DOCUMENTS. CONTRACTOR WILL BE ALLOWED CHARGE ORDERS FOR THE MATERIALS ARISING FROM DEFECT PROVIDED IT INCLUDED THESE FOLLOWING CONDITIONS.

9. MAINTAIN ORDERLY HOUSEKEEPING DURING CONSTRUCTION, AND UPON SUBSTANTIAL COMPLETION PERFORM FINAL CLEANUP. REMOVE CONSTRUCTION RUBBISH, SCAFFOLDING, EQUIPMENT, TEMPORARY PROTECTION, TEMPORARY FIELD STRUCTURES, AND OTHER EXCESSIVE OR UNNECESSARY EQUIPMENT OR MATERIALS IN ACCORDANCE WITH THE CONSTRUCTION, BUT NOT A PERMANENT PART THEREOF.

10. THOSE PERFORMING WORK AS A CONTRACTOR MUST EXAMINE SUBSTRATES AND CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND NOTIFY THE CONTRACTOR IN WRITING, OF CONDITIONS DETRIMENTAL TO THE PROPER AND TIMELY COMPLETION OF THE WORK. COMMENCEMENT OF WORK BY A TRADE ON A SURFACE OR CONSTRUCTION SHALL IMPLY ACCEPTANCE OF SUCH SURFACE OR CONSTRUCTION. DO NOT PROCEED WITH INSTALLATION UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

11. THE CONTRACTOR SHALL SECURE ALL PERMITS AND APPLICATIONS AND PAY ANY AND ALL FEES AS REQUIRED. THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND CERTIFICATES OF INSTALLATION REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. DELIVER ALL PERMITS, CERTIFICATES AND APPROVALS TO THE OWNER AGENT PRIOR TO FINAL ACCEPTANCE OF THE WORK. THE CONTRACTOR MUST FILE NECESSARY DRAWINGS, PERMITS, AND INSTRUMENTS OF SERVICE FOR EACH REQUIRED PERMIT AND INSPECTION, PRIOR TO COMMENCING WORK TO AVOID DELAYS DURING CONSTRUCTION.

12. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND MANUFACTURERS DATA SHEETS ON ALL EQUIPMENT AND MATERIALS SPECIFIED ON DRAWINGS FOR APPROVAL BY OWNER OR AGENT FOR THE OWNER. THESE DRAWINGS OR SHEETS SHALL CONTAIN ALL NECESSARY SHOP, FIELD, MANUFACTURER, INSTALLED, AND REMOVAL SIZE, DIMENSIONS, CAPACITY, WIRING DETAILS AND INSTALLATION INFORMATION. THE CONTRACTOR SHALL PROVIDE PERMITS, DRAWINGS AND DETAILS AND DETAILS NECESSARY FOR COMPLETE CATALOG AND INSTALLATION.

13. THE CONTRACTOR SHALL KEEP ONE SET OF THE LATEST ISSUE OF DRAWINGS WHICH SHALL REFLECT THE ACTUAL INSTALLED CONDITIONS AND CONNECTIONS OF ALL EQUIPMENT AND DEVICES. THE CONTRACTOR SHALL PROVIDE COPIES OF ALL DRAWINGS AND INFORMATION TO THE OWNER AGENT FOR THE OWNER AND TO THE SYSTEMS. ALL "AS-BUILT" DRAWINGS AND MISCELLANEOUS INFORMATION SHALL BE GIVEN TO THE OWNER AND ENGINEER AT COMPLETION OF WORK. THE CONTRACTOR SHALL MAINTAIN A RECORD OF THE PROJECT WITH THE OWNER AGENT FOR A ONE YEAR PERIOD FROM THE TIME OF OWNER ACCEPTANCE. ANY DEFECTS OCCURRING DURING THIS PERIOD SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

14. AS DIRECTED BY THE OWNER, ALL EXISTING EQUIPMENT AND MATERIAL IN USABLE CONDITION THAT IS REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER, OR HAVE BEEN DESTROYED OR DESTROYED BY THE CONTRACTOR. THE CONTRACTOR, ALL MATERIALS DEEMED FOR REMOVAL SHALL BE RECYCLED WHENEVER POSSIBLE, IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH WITHIN SPECIFICATION SECTION 01 74 19 (CONSTRUCTION WASTE MANAGEMENT).

15. CONTRACTOR IS TO PROVIDE ALL REQUIRED SCAFFOLDING, LADDERS, RIGGING, HOISTING AND ALL OTHER EQUIPMENT REQUIRED FOR THE INSTALLATION OF THEIR WORK.

16. ESTABLISH PASSAGE CLEARANCES REQUIRED TO DELIVER, INSTALL AND ERECT ALL REQUIRE EQUIPMENT. IF STRUCTURES, EQUIPMENT AND SYSTEMS MUST BE ALTERED TO ACCOMMODATE OR ERECT EQUIPMENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT AND SYSTEMS TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE, INCLUDING REMOVAL AND REPLACEMENT OF ALL CEILING AS REQUIRED TO COMPLETE THE WORK.

17. EXCAVATION FOR UNDER SLAB OR UNDERGROUND INSTALLATION OF CONDUTLS SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME WITHOUT DELAYING THE UNDERGROUND PIPING, WIRING AND CONDUTLS.

1. ALL HVAC EQUIPMENT SHALL MEET THE REQUIREMENTS SET FORTH IN THE ANSI/ASHRAE/IESNA STANDARD 90.1, ENTITLED "ENERGY STANDARDS FOR BUILDINGS EXCEPT LOW-RISE RESIDENTIAL BUILDINGS".
2. ALL METALLIC DUCTWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARD "HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE" AND NFPA STANDARD 90A TITLED "INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS". ALL DUCTWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH SMACNA PRESSURE CLASS.
3. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS. CONTRACTOR SHALL INCREASE THE DUCT SIZE ACCORDINGLY TO COMPENSATE FOR ACoustICAL DUCT LINING THICKNESS (UNLESS OTHERWISE NOTED). CONTRACTOR MAY ADJUST DUCT SIZES ACCORDINGLY TO SUIT FIELD CONDITIONS AS LONG AS THE DUCT FREE AREA AND STATIC PRESSURE DROP ARE EQUAL TO THE PROJECT DOCUMENTS.
4. CONTRACTOR SHALL PROVIDE ACCESS DOORS IN DUCTWORK FOR OPERATION, ADJUSTMENT AND MAINTENANCE OF ALL FANS, VALVES, COILS AND MECHANICAL EQUIPMENT.
5. ADEQUATELY SIZED ACCESS PANELS SHOULD BE PROVIDED ON BOTH SIDES OF THE SUBSYSTEMS, DUCTS, DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, HUMIDIFIERS, COILS AND OTHER DEVICES LOCATED IN THE DUCTWORK WHICH REQUIRE INSPECTION AND/OR MAINTENANCE.
6. CONTRACTOR SHALL PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCT WORK SYSTEMS (SUPPLY, RETURN, VENTILATION AIR AND EXHAUST) CONNECTED TO ALL AIR HANDLING UNITS, FANS AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT (UNLESS NOTED OTHERWISE).
7. ALL AIR HANDLING SYSTEMS SHALL BE DESIGNED AND INSTALLED WITH BALANCE DAMPERS LOCATED IN THE MAIN SUPPLY, EXHAUST AND OUTSIDE AIR DUCTS FOR PROPER BALANCING OF EACH SYSTEM.
8. DUCTWORK WILL INCLUDE ALL DUCTS, FITTINGS, TURNING VANES, DAMPERS, SUPPORTS, AND ALL ACCESSORIES, SUBASSEMBLIES, AND PARTS INCORPORATED THEREIN OR REQUIRED FOR THE INSTALLATION AND COMPLETION OF SYSTEMS. ALL SUPPLY AND RETURN DUCT BRANCHES SHALL BE DESIGNED AND INSTALLED WITH BALANCE DAMPERS.
9. UNLESS NOTED OTHERWISE DUCT LEAKAGE CLASSES AND SEAL CLASSES WILL BE IN ACCORDANCE WITH CLASSES AND STANDARDS DESCRIBED IN SMACNA "DUCT CONNECTION STANDARDS METAL AND FLEXIBLE" AND "SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL".
10. SMOOTH TURN RADIUS DUCTWORK OR TURNING VANS AND 45 DEGREE ENTRY OR CONICAL DUCT BRANCH CONNECTIONS SHALL BE USED THROUGHOUT.
11. ALL DAMPER SHAFTING, RODS AND LINKAGE WILL HAVE CORROSION RESISTANT FINISH. ALL VOLUME DAMPERS WILL MOVE FREELY THROUGH FULL TRAVEL WITHOUT BINDINGS.
12. ALL DUCTS SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVING DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST.
13. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
14. INSTALL NEW THERMOSTATS FOR ALL NEW AND EXISTING ZONES.
15. CONTRACTOR SHALL PROPERLY SUPPORT & BRACE ALL DUCTWORK IN ACCORDANCE WITH SMACNA STANDARDS. DUCTWORK SUPPORT MATERIALS, UNLESS OTHERWISE INDICATED, SUPPORTS, FASTENERS, ANCHORS, STRAPS, TRIM AND ANGLES WILL GENERALLY BE THE SAME MATERIAL AS THE DUCTWORK, HOT DIPPED GALVANIZED.
16. DUCT HANGERS, SUPPORTS AND METHODS OF INSTALLATION WILL CONFORM TO SMACNA STANDARDS AND THE MANUFACTURERS' INSTALLATION REQUIREMENTS WHERE NOT OTHERWISE SPECIFIED, INDICATED OR REQUIRED.
17. ALL INTERIOR AND EXTERIOR WALL, CEILING AND ROOF OPENINGS AND DUCT AND PIPE THROUGH WALL PENETRATIONS, FRAMING, SLEEVES, WEATHERPROOFING AND FIRE SEALING SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE.
18. BUILDING HAS BEEN DESIGNED USING THE VAHBS. CONTRACTOR SHALL PROVIDE AND INSTALL ALL FIRE DAMPERS IN ACCORDANCE WITH UL 555, MANUFACTURER'S REQUIREMENTS, AND PER NFPA 90A, EXCEPT WHERE SUPERCEDED BY THE VAPFDM. ALL FIRE DAMPERS SHALL BE UL LISTED AND LABELED CONSISTENT WITH THE WALLS OR FLOORS THAT ARE PENETRATED. PROVIDE ACCESS DOORS SIZED AND LOCATED TO FACILITATE TESTING AND RESETTING OF ALL FIRE DAMPERS.
19. INSULATE PER SPECIFICATION SECTION 23 07 11.
20. THE NEW DUCT SYSTEM IS TO BE CLEANED THOROUGHLY OF ALL DEBRIS BEFORE INSTALLING INLET/OUTLET DEVICES.
21. CONTRACTOR SHALL TEST ADJUST & BALANCE THE COMPLETED SYSTEM. ALL BALANCING WORK SHALL BE DONE UNDER THE DIRECT SUPERVISION OF AN ABC OR NEBB-QUALIFIED SUPERVISOR WHO SHALL CERTIFY THE RESULTS.
22. TEST, ADJUST AND BALANCE WORK WILL DEMONSTRATE THAT ALL SYSTEMS OPERATE AS THEY WERE INTENDED TO. UPON COMPLETION OF THE WORK A WRITTEN TEST AND BALANCE REPORT WILL BE SUBMITTED TO THE OWNER. FORMS AND PROCEDURES UTILIZED FOR THIS WORK WILL BE AS PROPOSED BY THE ABC OR OTHER NATIONALLY RECOGNIZED ORGANIZATION EQUIVALENT TO THE OWNER.
23. ALL DUCTWORK, PIPING AND EQUIPMENT SHOWN ON NEW WORK PLANS AND DETAILS SHALL BE CONSIDERED AS NEW UNLESS IDENTIFIED AS EXISTING TO REMAIN.

1. ALL PIPING MATERIALS AND COMPONENTS INCLUDING FITTINGS, PIPE, FLANGES, VALVES, ETC. SHALL BE DESIGNED, FABRICATED AND INSTALLED PER APPROPRIATE SECTIONS OF THE LATEST ASME AND ASTM CODES AND STANDARDS AND THE MATERIAL SPECIFICATIONS FOUND IN THE PROJECT DOCUMENTS.
2. CONTRACTOR TO INSTALL HIGH POINT VENTS AT ALL SYSTEM HIGH POINTS AND LOW POINT DRAINS AT SYSTEM LOW POINTS. VENTS AND DRAINS ARE REQUIRED TO FACILITATE SYSTEM DRAINING AND VENTING DURING TESTING AND START-UP.
3. SURFACES TO BE SOLDERED SHALL BE CLEANED BRIGHT. THE JOINTS SHALL BE PROPERLY FLUXED AND MADE WITH APPROVED SOLDER. SOLDER JOINTS FOR POTABLE WATER SHALL BE MADE WITH A SOLDER CONTAINING NOT MORE THAN 0.2 PERCENT LEAD.
4. UNIONS SHALL BE INSTALLED AT ALL EQUIPMENT. THE USE OF DIELECTRIC UNIONS MUST BE INSTALLED IN AREAS WHERE JOINING OF DISSIMILAR METALS (i.e. CARBON STEEL TO COPPER OR BRONZE, ETC.). THIS IS TO FACILITATE PIPING REMOVAL AND REASSEMBLY FOR FUTURE MAINTENANCE WORK AND/OR PREVENT GALVANIC CORROSION.
5. CONTRACTOR SHALL PROPERLY BRACE, HANGERS, AND SUPPORT ALL PIPING, VALVES ETC. UNLESS SHOWN OTHERWISE, ALL PIPE HANGERS AND SUPPORTS SHALL BE DESIGNED, MANUFACTURED AND INSTALLED PER MSS SP-58, MSS SP-69 AND MSS SP-89.
6. ALL ABOVEGROUND PIPING SHALL BE INSULATED AND JACKETED AS NOTED IN THE SPECIFICATIONS.
7. ALL PIPES THAT PASS THROUGH EXTERIOR WALLS SHALL BE SLEEVED AND MADE WEATHER TIGHT.
8. ALL PIPING AND VALVES MUST BE PROPERLY IDENTIFIED AND LABELED PER ANSI 13.1. ENTITLED "SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS". ALL VALVES MUST BE IDENTIFIED AND TAGGED WITH WEATHERPROOF TAGS.
9. ALL PIPES OR TUBING WHICH PASS THROUGH RATED AND NON-RATED WALLS, FLOORS AND FOUNDATION WALLS, SHALL PASS THROUGH A SCHEDULE 40 CARBON STEEL PIPE SLEEVE. SLEEVES WHICH PASS THROUGH MASONRY SHALL BE GALVANIZED COATED. ALL SLEEVES SHALL BE INSTALLED FLUSH ON BOTH SIDES OF WALL PENETRATION.
NON-RATED WALL: THE SLEEVE SHALL BE SIZED TO ALLOW FREE PASSAGE OF INSULATED AND NON-INSULATED PIPES AND TUBING.
RATED WALL: PIPES WHICH PASS THROUGH FIRE-RATED WALLS & FLOORS SHALL USE THE APPROPRIATE CODE APPROVED, TESTED AND INSTALLATION METHOD OF SEALING WHILE MAINTAINING THE INTEGRITY OF THE WALL'S FIRE RATING(S).
EXTENSION WALLS & FOUNDATION WALLS: PIPES WHICH PASS THROUGH EXTENSION WALLS OR FOUNDATION WALLS SHALL BE SEALED AND MADE WEATHER TIGHT.
10. INSULATE COLD AND HOT WATER PIPING WITH FIRE RETARDANT PAPER BARRIER JACKET. PIPE INSULATION SHALL BE SEALED WITH A FIRE RESISTIVE ADHESIVE. SEE SPECIFICATIONS.
11. ALL PREFABRICATED/PREINSULATED PIPING & FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS & INSTRUCTIONS.
12. FIELD-ROUTED PIPING SHALL BE INSTALLED IN A MANNER THAT DOES NOT INTERFERE WITH THE EQUIPMENT OF FUTURE MAINTENANCE WORK. THE DESIGN & LAYOUT SHALL BE APPROVED BY THE FACILITY & ENGINEER PRIOR TO INSTALLATION.
13. THE CONTRACTOR MUST PROPERLY SUPPORT, GUIDE, & ANCHOR ALL PIPING & VALVES. LOCATIONS OF PIPE RACKS ARE SHOWN WITHIN THE PROJECT DRAWING DOCUMENTS. PIPE SUPPORT SPACING NOT DETAILED SHALL NOT EXCEED THE SPACING DISTANCES SHOWN ON THE TABLE IN THIS DRAWING.
14. UNLESS SHOWN OTHERWISE, ALL PIPE HANGERS & SUPPORTS SHALL BE DESIGNED, MANUFACTURED, & INSTALLED PER MSS SP-58.
15. INSULATION PROTECTION SADDLES SHALL BE INSTALLED AT ALL SUPPORT LOCATIONS WITHIN ALL SECTIONS OF THE INSULATED PIPING. INSULATION PROTECTION SADDLES ARE SHOWN & SPECIFIED WITHIN THE PROJECT CONTRACT DRAWINGS.
16. ALL MANUALLY OPERATED VALVES LOCATED 7'-0" ABOVE FLOOR OR PLATFORM SHALL BE PROVIDED & INSTALLED WITH CHAIN OPERATORS & CHAIN.
17. ALL ISOLATION VALVES LOCATED ON THE EXTERIOR ROUTED PIPING SYSTEM SHALL BE SUPPLIED WITH LOCKING DEVICES.
18. ALL NON PRE-ENGINEERED/PREINSULATED PIPING SHALL BE INSULATED & JACKETED PER THE PROJECT CONTRACT DOCUMENTS.
19. CONTRACTOR IS RESPONSIBLE FOR ALL CLEANING, HYDRO-TESTING, & COORDINATION OF INSPECTIONS OF THE NEW SYSTEMS IN ACCORDANCE WITH THE PROJECT CONTRACT DOCUMENTS & ALL APPLICABLE CODES.
20. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, & OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
21. ALL VALVES SHALL BE INSTALLED SO THAT VALVES REMAIN IN SERVICE WHEN EQUIPMENT OR PIPING ON EQUIPMENT SIDE OF VALVE IS REMOVED.
22. ALL BALANCING VALVES & BUTTERFLY VALVES SHALL BE PROVIDED WITH POSITION INDICATORS & MAX. ADJUSTABLE STOPS (MEMORY STOPS).
23. ALL VALVES (EXCEPT CONTROL VALVES) & STRAINERS SHALL BE FULL SIZE OF PIPE BEFORE REDUCING SIZE TO MAKE CONNECTIONS TO EQUIPMENT & CONTROLS.
24. INSTALL ALL PIPING WITHOUT FORCING OR SPRINGING.
25. ALL PIPING WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
26. PROVIDE FLEXIBLE CONNECTIONS IN ALL PIPING SYSTEMS CONNECTED TO PUMPS, CHILLERS, COOLING TOWERS, & OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION EXCEPT WATER COILS. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AS CLOSE TO THE EQUIPMENT AS POSSIBLE OR AS INDICATED ON THE DRAWINGS.

FABRICATION & ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE "STEEL OF CONSTRUCTION MANUAL," 13TH EDITION, AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) INCLUDING SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS, SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, & AISC CODE OF STANDARD PRACTICE.

2. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS & SHALL CONFORM TO "STRUCTURAL WELDING CODE AWS/AWS D1.1," LATEST EDITION, AMERICAN WELDING SOCIETY (AWS).

3. WIDE FLANGE SHAPES: ASTM A992, GRADE 50

4. OTHER STRUCTURAL SHAPES & PLATES: ASTM A36, A572

5. STEEL PIPE: ASTM A53, GRADE B

6. STEEL TUBING: ASTM A500, GRADE B

7. GALVANIZED STRUCTURAL STEEL

A. STRUCTURAL SHAPES AND RODS ASTM A123

B. BOLTS, FASTENERS AND HARDWARE ASTM A153

8. ALL BOLTED CONNECTIONS SHALL BE WITH A325 HIGH STRENGTH BOLTS 3/4" MIN., UNLESS NOTED OTHERWISE.

9. ANCHOR RODS SHALL CONFORM TO ASTM F1554, UNLESS NOTED OTHERWISE.

10. WELDING ELECTRODES SHALL BE E70XX FOR MANUAL ARC WELDING. ALL WELDERS SHALL BE CERTIFIED BY THE AWS. MIN. WELD SIZE SHALL BE 3/16" UNLESS OTHERWISE.

11. CUTS, HOLES, COPING, ETC. REQUIRED FOR OTHER TRADES OR FIELD CONDITIONS SHALL BE SHOWN ON THE SHOP DRAWINGS & MADE IN THE SHOP. CUTTING OR BURNING OF MAIN STRUCTURAL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.

12. SUBMIT SHOP DRAWINGS FOR FABRICATION & ERECTION OF STRUCTURAL STEEL. CLEARLY INDICATE COORDINATED DIMENSIONS. SHOP & ERECTION DRAWINGS MUST SHOW ALL SHOP/FLOOR & WELDS. INITIAL SHOP DRAWING SUBMITTAL SHALL INCLUDE PROPOSED CONNECTION DETAILS & JOB STANDARDS. PROVIDE SIGNED & SEALED CALCULATIONS FOR ALL NON-STANDARD CONNECTION DETAILS SHOWING DESIGN CAPACITIES.

13. STEEL MEMBERS SHOWN ON PLAN SHALL BE EQUALLY SPACED UNLESS NOTED OTHERWISE.

14. THE GENERAL CONTRACTOR & STEEL ERECTOR SHALL NOTIFY THE ENGINEER OF ANY FABRICATION OR ERECTION ERRORS OR DEVIATIONS & RECEIVE WRITTEN APPROVAL BEFORE ANY FIELD CORRECTIONS ARE MADE.

15. ALTERNATE CONNECTION DETAILS MAY BE USED IF SUCH DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW & APPROVAL. HOWEVER, THE ENGINEER SHALL BE THE SOLE JUDGE OF ACCEPTANCE & THE CONTRACTOR'S BID SHALL ANTICIPATE THE USE OF THOSE DETAILS SHOWN ON THE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF SUCH ALTERNATE DETAILS WHICH HE/SHE PROPOSES.

16. ALL INTERIOR STEEL SHALL BE PAINTED WITH SHOP STANDARD PRIMER UNLESS NOTED OTHERWISE.

17. STEEL ANGLES & PLATES ALONG WITH BOLTS, NUTS, & WASHERS, IN DIRECT CONTACT WITH EXTERIOR FINISH MASONRY, & ALL EXTERIOR EXPOSED STRUCTURAL STEEL, SHALL BE HOT-DIPPED GALVANIZED PER ASTM A123 & A153.

18. EXISTING FRAMING REQUIRING WELDING SHALL BE THOROUGHLY CLEANED TO ENSURE PROPER WELDING. PROVIDE TEMPORARY SHORING WHEN WELDING TO EXISTING STEEL.

19. FIELD WELDED SURFACES WITHIN 4" OF WELD SHALL BE CLEANED & GROUND SMOOTH. AFTER WELDING COAT THE EXPOSED AREA WITH GALVANIZING REPAIR PAINT. GALVANIZING REPAIR PAINT SHALL BE A HIGH ZINC DUST CONTENT PAINT COMPLYING WITH FEDERAL SPECIFICATIONS DOD-P-21035A OR SSPC-PAINT-20, COLD GALVANIZING COMPOUND BY ZTRC PRODUCTS CO. OR EQUAL.

20. GUYS & OTHER BRACING REQUIRED TO PROVIDE LATERAL STABILITY TO STEEL FRAME SHALL BE ADEQUATELY SIZED & ANCHORED. THIS BRACING SHALL REMAIN UNTIL PERMANENT BRACING ELEMENTS & ATTACHED CONNECTION IS INSTALLED.

21. ALL CONNECTIONS SHALL BE FRAMED BEAM CONNECTIONS DESIGNED IN ACCORDANCE WITH THE AISC MANUAL & HALF OF THE ALLOWABLE UNIFORM LOAD FROM "MAXIMUM TOTAL UNIFORM LOAD" TABLES, BUT NOT LESS THAN 6 KIPS. PROVIDE DOUBLE ANGLE CONNECTIONS FULL DEPTH OF SUPPORTING BEAM, UNLESS OTHERWISE APPROVED. MIN. 2 BOLTS PER CONNECTION. SINGLE ANGLE OR SHEAR TAB CONNECTIONS ARE NOT ACCEPTABLE. ALL BEAM TO COLUMN CONNECTIONS SHALL BE DESIGNED FOR THE MIN. SHEAR REACTION INDICATED ABOVE IN COMBINATION WITH A 10 KIP AXIAL FORCE (ACTING IN BOTH TENSION & COMPRESSION).

22. VISUALLY INSPECT ALL FILLET WELDS. 100% OF ALL FILLET WELDS IN PRIMARY CONNECTIONS & MULTI-PASS WELDS SHALL BE TESTED BY THE MAGNETIC PARTICLE METHOD, COMPLYING WITH ASTM E709, PERFORMED ON THE ROOT PASS & ON THE FINISHED WELD.

23. FIELD TEST BOLTED CONNECTIONS IN ACCORDANCE WITH AISC.

24. ALL CONNECTIONS SHALL BE SYMMETRICAL ABOUT THE AXIS OF THE MEMBER CONNECTED. PROVIDE ONLY 1 GRADE OF BOLT FOR EACH BOLT DIAMETER TO BE USED IN THE CONNECTIONS. DO NOT MIX GRADES OR BOLTS.

25. PROVIDE 1/4" CAP PLATES ON ALL EXPOSED HSS MEMBER ENDS UNLESS NOTED OTHERWISE.

* NOTE 1: THE ABOVE TABLE IS DERIVED FROM MSS SP-58 AND THE ANSI/ASME B31.1. THIS TABLE DOES NOT APPLY WHERE THERE ARE CONCENTRATED LOADS BETWEEN SUPPORTS, I.e. FLANGES, VALVES ETC.

NOTE 2: 10 FT. MAX. SPACING MIN. (1) HANGER PER SECTION CLOSE TO JOINT & CHANGE OF DIRECTION & BRANCH CONNECTIONS

VA FORM 08-6231

The seal is circular with "COMMONWEALTH OF PENNSYLVANIA" around the top half and "PROFESSIONAL ENGINEER" around the bottom half. In the center, it says "REGISTERED" at the top, "THOMAS L. CHAPMAN" in the middle, and "No. PED0440320" at the bottom. A signature is written over the seal.



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MECHANICAL GENERAL NOTES

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PF&A

Approved: Medical Center Director

Location **HUNTINGTON, WV**

Drawn
JLF

Drawing Number

Dwg.044 of 178

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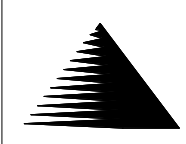
HVAC PHASE NOTES - NEW WORK:

- PRIOR TO EVERY PHASE OF THE PROJECT CONSTRUCTION EFFORTS, PERFORM TESTING AND BALANCING TO DOCUMENT AND MAINTAIN AIR FLOWS OUTSIDE OF THE PROJECT AND ACTIVE PHASE AREAS. DOCUMENT ALL AIRFLOW AND SPACE PRESSURE/ROOM OFFSETS WITHIN THE PROJECT AREA PRIOR TO PROCEEDING TO THE NEXT PHASE.
- 1A PHASE 1A: WORK TO INCLUDE, BUT NOT BE LIMITED TO, PROVIDING FOR TEMPORARY EXHAUST WITHIN TEMPORARY GAS STORAGE ROOM (ANESTHESIA 3B-127). PROVIDE TEMPORARY SECTIONS CONNECTED TO THE INTERIOR SIDE OF THE LOUVER TO ALLOW PROPER VENTILATION OF THE TEMPORARY GAS STORAGE ROOM UNTIL NEW GAS STORAGE ROOM IS COMPLETE. PROVIDE WEATHER HOOD WITH INSECT SCREEN ON EXTERIOR OF THE MAKE-UP AIR INLET/BOTTOM PORTION OF LOUVER. PROVIDE BIRD SCREEN AND BACKDRAFT DAMPER AND EXHAUST AIR DISCHARGE/UPPER PORTION OF INTERIOR SIDE OF THE LOUVER. BLANK OFF THE UNUSED SECTIONS OF THE TEMPORARY LOUVER WITH INSULATED SHEET METAL. PROVIDE MERV 7 FILTER RACK AND BAROMETRIC INTAKE DAMPER ON BOTTOM MAKE-UP INLET. PROVIDE TEMPORARY HEATING HOT WATER UNIT HEATER MOUNTED IN SPACE TO ENSURE LOCAL HEAT SOURCE/FREEZE PROTECTION FOR DIRECT OUTDOOR AIR MAKE-UP. PROVIDE LOCAL ROOM F-STAT FOR UNIT HEATER. ON-OFF CONTROL. RELocate EXISTING EXHAUST FAN 3B-111 TO TEMPORARY GAS STORAGE ROOM FROM EXISTING GAS STORAGE ROOM. FAN INTENDED FOR CONTINUOUS OPERATION.
- 1B PHASE 1B: WORK TO INCLUDE, BUT NOT BE LIMITED TO, PROVIDING NEW UTILITY PIPING FOR PHASE 2 ROOF TOP PEM THROUGH CEILING OF THIRD FLOOR AND ACROSS THIRD FLOOR ROOF TO EXTEND STEAM/CONDENSATE/CHILLED WATER/MAKE-UP WATER/EMERGENCY POWER, ETC. TO THE PEM. AC-8RF-9 SERVICE TO THE AREAS OF PHASE 1B WILL BE EXTENDED FROM EXISTING SUPPLY AND RETURN MAINS BRANCHES/MAINS WITHIN THE EXISTING MECHANICAL EQUIPMENT ROOM. ALL NEW DUCTWORK/AIR TERMINAL UNITS/SHOT WATER REHEAT COILS, ETC. WILL BE PROVIDED FOR PHASE 1B. NEW LOCKER ROOM/LOUNGE GENERAL EXHAUST FAN IS REQUIRED TO BE INSTALLED ON THE THIRD FLOOR ROOF TO SERVE THESE AREAS.
- 2 PHASE 2: WORK TO INCLUDE, BUT NOT BE LIMITED TO, PROVIDING MEP/FP INFRASTRUCTURE FOR THE FIRST STAGE OF NEW OPERATING ROOMS (OR1, OR2, OR3). THIS PHASE WILL INCLUDE THE RIGGING, MOUNTING, INTERCONNECTING AND START-UP/TESTING OF THE NEW CUSTOMFACTORY FABRICATED PEM WITH NEW SURGERY AHU AND NEW SURGERY FAN (REHEAT) GENERATION/PUMPING PACKAGE ON THE ROOF ABOVE THE NEW THIRD FLOOR OR1 & OR2 (SEE ROOF PLAN, PEM DETAIL DRAWINGS AND SPECIFICATIONS FOR MORE INFO).
- 3 PHASE 3: WORK TO INCLUDE, BUT NOT BE LIMITED TO, PROVIDING MEP/FP INFRASTRUCTURE FOR NEW OR-5, SURGICAL SUITE SUPPORT, AND THE NEW PACU/RECOVERY AREAS. THIS PHASE WILL INCLUDE THE HVAC SERVICE ZONES AND THE NEW PACU AREA OF THE BUILDING FROM EXISTING AC-8/RF-9 TO EXISTING AC-6/EF-50 SO THAT THE NEW PACU/RECOVERY AREA WILL BE SERVED BY EQUIPMENT THAT IS CURRENTLY CONNECTED TO EMERGENCY POWER. DESIGN AND CONSTRUCTION OF THE FUTURE HYBRID OR-6/GENERAL OR-4/ANESTHESIA WORK ROOM AND FROZEN SECTION WILL BE BASED ON THE AVAILABLE INFORMATION FROM THE VAMC. HYBRID OR-6/GENERAL OR-4 DESIGN MUST BE CONFIRMED / UNDERTAKEN BY A FUTURE PROJECT. PROGRAM INFORMATION FOR POSSIBLE IMAGING EQUIPMENT, IMAGING OR CEILING CONFIGURATION, CONTROL ROOM FOR IMAGING COMPONENTS, ETC. MUST ALL BE ESTABLISHED, COORDINATED AND CONFIRMED WITHIN THE FRAMEWORK OF A FUTURE / SEPARATE PROJECT. THE SURGICAL / STERILE SUITE WILL BE SERVED BY THE NEW ROOF TOP PEM (AC-16/RF-16) WITH THE EXCEPTION OF THE CLEAN CORR. LOW VOLTAGE AND HYBRID/IMPLANT/EQUIPMENT/SOILED STORAGE ROOMS. HVAC SERVICE OF THESE AREAS WILL BE FROM THE EXISTING AC-8 AND EF-8. REFER TO DRAWING M100 FOR MORE INFORMATION REGARDING HVAC/AIR HANDLING EQUIPMENT SERVICE ZONES. EF-16 SERVICE TO PACU/ISOLATION ROOM WILL ALSO BE REQUIRED AT THIS TIME. TAB/REBALANCING/COMMISSIONING EFFORTS TO VERIFY EF-16/HEPA OPERATION MUST BE SCHEDULED FOR THIS PHASE. ACCESS TO ELEVATOR LOBBIES AND EGRESS STAIRWAYS MUST BE MAINTAINED DURING ALL OCCUPIED PERIODS. OFF-HOURS WORK EXPECTED FOR ALL CORRIDOR AND ELEVATOR LOBBY AREAS AT A MINIMUM.
- 4A PHASE 4A: WORK TO INCLUDE, BUT NOT BE LIMITED TO, PROVIDING MEP/FP INFRASTRUCTURE FOR THE FINAL STAGE OF NEW OPERATING ROOMS/SURGICAL/STERILE SUITE. THE NEW PRE-OPSURGICAL, PREP AREAS AND CONSTRUCTING THE CENTRAL CORRIDOR/ADMIN AREAS THROUGH TRENCHING CONNECTING THE NEW LOCKER AREA TO THE EXISTING STAFF ELEVATOR LOBBY, ETC. THIS PHASE WILL INCLUDE THE CONSTRUCTION OF THE SIXTH / ORTHO/ OPERATING ROOM (OR6), IMPLANT STORAGE, AND WILL ELIMINATE THE NEED FOR THE TEMPORARY GAS STORAGE ROOM CONSTRUCTED IN PHASE 1A. AN ICRA TUNNEL MUST BE COORDINATED IMMEDIATELY IN THE PHASE TO ALLOW CONTINUOUS ACCESS TO THE CLEAN DUMBWATER BY THE NEW/ACTIVE ORS 1 THROUGH 5. ALL OF THE NEW OPERATING ROOM AHU SERVICE CAPACITY WILL BE FULLY UTILIZED AT THIS COMPLETION OF THIS PHASE. AC-8RF-8 AND AC-10EF-10 OPERATION WILL BE DISCONTINUED DURING THE PHASE 4A DEMOLITION PERIOD AS AC-8RF-9 WILL TEMPORARILY SERVE PHASE 3 PACU AREAS. AC-8RF-9 WILL NEED TO BE OPERATED AS 100% OA DURING THE BRIEF PERIOD REQUIRED TO EXTEND AC-8RF-8 SERVICE ACROSS THE PHASE 4A PROJECT AREA TO THE COMPLETED PHASE 3 AREA. NEW GAS STORAGE ROOM WILL BE BUILT OUT AND NEW ROOF TOP EXHAUST FAN FOR THIS ROOM WILL BE INSTALLED AND OPERATIONAL, ALLOWING THE ELIMINATION OF THE TEMPORARY GAS STORAGE ROOM DURING PHASE 4B. NEW AC-10 SUPPLY AIR FINAL FILTER ASSEMBLY MUST BE INSTALLED UPON ELIMINATION OF THE EXISTING SUPPLY PLENUM WITHIN THE THIRD FLOOR MECHANICAL ROOM (FLOOR SPACE BECOMES AVAILABLE TO MOUNT THIS REQUIRED FINAL FILTER ASSEMBLY SINCE AC-10 LACKS FINAL FILTRATION AFTER SUPPLY FAN). FINAL ISOLATION ROOM OF THE PROJECT IS ADDED AS EF-16 DUCTWORK IS EXTENDED TO THIS PROJECT AREA. FINAL TAB/REBALANCING/ COMMISSIONING OF EF-16 AND HEPA FILTER TO BE CARRIED OUT. STAFF RECOMMENDED TO USE SOUTHEAST STAIR TOWER NUMBER THREE FOR ACCESS TO NEW LOCKERS AND LOUNGE UNTIL THE SUBSTANTIAL COMPLETION OF PHASE 4A. ACCESS TO ELEVATOR LOBBIES AND EGRESS STAIR FROM NEW PACU AREA MUST BE MAINTAINED DURING ALL OCCUPIED PERIODS. OFF-HOURS WORK EXPECTED FOR ALL CORRIDOR AND ELEVATOR LOBBY AREAS AT A MINIMUM.
- 4B PHASE 4B: WORK TO INCLUDE, BUT NOT BE LIMITED TO, SUBSTANTIAL COMPLETION OF THE PROJECT WITH THE ELIMINATION OF THE TEMPORARY GAS STORAGE ROOM AND CONSTRUCTION/FIT-OUT OF NEW ANESTHESIA OFFICE-ADMIN AREA OF THE PROJECT. TEMPORARY HOT WATER UNIT HEATER, TEMPORARY MAKE-UP AIR INTAKE FILTER/DAMPER AND TEMPORARY EXHAUST FAN ASSEMBLY WITH LOUVER/WEATHER HOOD/PLENUM WILL BE REPLACED BY THE FINAL HVAC DESIGNED TO SERVE THE COMPLETED ANESTHESIA PERIMETER OFFICE/ADMIN AREA. WINDOW TO BE REPLACED ONCE TEMPORARY LOUVER REMOVED. NEW F-STAT/OCCUPANCY SENSOR MOUNTING TO BE COORDINATED WITH VAMC/COR BASED ON FINAL FURNITURE LAYOUT. SEE NEW WORK PLAN FOR ADDITIONAL INFORMATION.

1 3rd FLOOR PLAN - OVERALL NEW WORK PHASE PLAN
1/8" = 1'-0"

CONSULTANTS:

ARCHITECT / ENGINEERS:



Miller-Remick LLC
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PF&A

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Drawing Title
**MECHANICAL
3RD FLOOR OVERALL PLAN - NEW WORK**

Approved: Medical Center Director

Project Title
**RENOVATE SURGICAL
SERVICE & UPGRADE
OPERATING ROOMS**

Location **HUNTINGTON, WV**

Date
10.31.2014

Checked
MPP

Drawn
JLR

Project Number
581-13-101

Building Number
1S

Drawing Number
M1.00

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Office of
Construction
and Facilities
Management





